What is claimed is:

1. An information processing apparatus for displaying a plurality of linked information objects in a virtual space in accordance with visual field data, a particular information object representing a content of a particular content type, said visual field data defining a visual field in said virtual space, said apparatus comprising:

holding means for holding, in an executable manner, intermediate data generating means specific to said content type for generating intermediate data for display, and display image generating means specific to said content type for generating a display image from said generated intermediate data;

first means for causing said intermediate data generating means to generate intermediate data for displaying said particular information object, when it is determined, in accordance with a geometric relation between said visual field and said particular information object, that said intermediate data of said particular information object should be generated; and

second means for causing said display image generating means to generate a display image of said particular information object from said generated intermediate data, when it is determined, in accordance with the geometric relation between said visual field and said particular information object, that said particular information object should be displayed.

2. The information processing apparatus according to Claim 1 wherein said intermediate data generating means and said display image generating means operate asynchronously with each other.

3. The information processing apparatus according to Claim 1 wherein said first and second means are controlled by control means; and

said intermediate data generating means operates under
the control of said first means, to generate and renew said
intermediate data for displaying said information object, said
display image generating means operating simultaneously with
said intermediate data generating means, under the control of
said second means, to generate a display image of said
information object from said generated and renewed
intermediate data.

4. The information processing apparatus according to
Claim 1 wherein said holding means holds at least one content
type specific data processing means, said at least one content
type specific data processing means including at least
intermediate data generating means for generating
intermediate data of an information object of one content type
and display image generating means for generating a display
image of the information object of said one content type.

5. The information processing apparatus according to
Claim 1 wherein said holding means holds in an executable manner
at least data processing means specific to said content type,
said data processing means including said intermediate data
generating means, said display image generating means, content
data capturing means specific to said content type for
capturing content data of said particular information object,
and intermediate data deleting means specific to said content
type for deleting said generated intermediate data in an
intermediate data memory.

6. The information processing apparatus according to
Claim 1 wherein said intermediate data generating means is
implemented in form of intermediate data generating program
codes, and said display image generating means is implemented
in the form of display image generating program codes; and
said apparatus comprises further means for capturing said
intermediate data generating program codes and said display
image generating program codes into said holding means from

an external device or a communication line.

7. The information processing apparatus according to Claim 1 further comprising:

means for smoothly changing said visual field data;

a memory for storing therein said generated intermediate data;

a display memory; and

means for rendering said display image on to said display memory;

said first means determining for each of said plurality of information objects whether or not intermediate data for displaying that information object should be generated, in accordance with the geometric relation between said visual field and that information object;

said second means determining for each of the information objects for which intermediate data has been generated whether a display image of that information object should be generated from said generated intermediate data, in accordance with the geometric relation between said visual field and that information object.

8. The information processing apparatus according to Claim 1 further comprising:

means for assigning a display priority to each of said plurality of information objects;

said first means comparing said display priority of said particular information object with a predetermined threshold to thereby determine whether or not the intermediate data of said particular information object should be generated;

said second means comparing said display priority of said particular information object with a predetermined threshold to thereby determine whether or not the display image of said particular information object should be generated.

9. The information processing apparatus according to Claim 1 wherein:

said holding means further holds intermediate data deleting means specific to said content type for deleting said generated intermediate data;

said information processing apparatus further comprises a memory region for storing therein said intermediate data and managing data for said particular information object, and means for assigning display priorities to respective ones of said plurality of information objects;

said first means comparing said display priority of said particular information object with a predetermined threshold to thereby determine whether or not the intermediate data of said particular information object should be generated or renewed;

said first means causing said intermediate data generating means to generate or renew said intermediate data of said particular information object when the display priority of said particular information object is higher than the predetermined threshold;

said first means causing said data deleting means to delete said intermediate data of said particular information object in said memory region when the display priority of said particular information object is lower than a predetermined threshold;

said first means deleting the managing data of said particular information object in said memory region when the display priority of said particular information object is lower than a predetermined threshold.

10. The information processing apparatus according to Claim 1 wherein said display image generating means determines a form in which said display image is displayed, in accordance with the geometric relation between said visual field and said particular information object.

11. The information processing apparatus according to Claim 1 wherein display priorities are assigned to respective ones of said plurality of information objects; and when the

display image of said particular information object is to be displayed, said display image generating means determines a form in which said display image of said particular information object is to be displayed, in accordance with the display priority of said particular information object.

12. The information processing apparatus according to Claim 1 further comprising:

a memory region for storing therein display data including intermediate data for displaying said plurality of information objects; and

memory managing means for detecting an amount of said memory region occupied by said display data and time-sequentially deleting at least part of intermediate data in said memory region which has not been used for display image generation for the longest time.

13. The information processing apparatus according to Claim 1 further comprising:

third means for selecting one of said plurality of information objects as a representative object and defining said visual field by defining a geometric relation of said representative object to said visual field;

said third means altering said representative object, without changing the geometric relations of said plurality of information objects to said visual field, as said visual field shifts in said virtual space;

said first means traversing linkages between said plurality of information objects, starting with said representative object, to thereby determine whether or not said intermediate data of said particular information object should be generated.

14. The information processing apparatus according to Claim 13 wherein display priorities are assigned to respective ones of said plurality of information objects, and said third means selects one of said plurality of information objects

39

having a highest display priority as said representative
object.

15. A program stored on a storage medium for use with
an information processing apparatus for displaying a plurality
of linked information objects in a virtual space in accordance
with visual field data, a particular information object
representing a content of a particular content type, said
visual field data defining a visual field in said virtual space,
said apparatus including a holding region for holding, in an
executable manner, a program specific to said content type
being operable to effect the steps of: generating intermediate
data specific to said content type, and generating a display
image specific to said content type from said generated
intermediate data;
said first program being operable to effect the steps of:
causing intermediate data for displaying said particular
information object to be generated in the intermediate data
generating step, when it is determined, in accordance with a
geometric relation between said visual field and said
particular information object, that said intermediate data of
said particular information object should be generated; and
causing a display image of said particular information
object to be generated from said generated intermediate data
in the display image generating step, when it is determined,
in accordance with the geometric relation between said visual
field and said particular information object, that said
particular information object should be displayed.

16. The program according to Claim 15 being operable to
asynchronously effect the step of causing intermediate data
to be generated with the step of causing a display image to
be generated.

17. The program according to Claim 15 being operable to
further effect the step of controlling to call the intermediate
data generating step to thereby cause the intermediate data

for displaying said information object to be generated and renewed, and simultaneously, call the display image generating step to thereby cause the display image of said information object to be generated from said generated and renewed intermediate data.

18. The program according to Claim 15 wherein said holding region includes a region for holding, in an executable manner, at least one content type specific processing program, said at least one content type specific processing program being operable to effect at least the steps of:

generating intermediate data of an information object of one content type, and

generating a display image of the information object of said one content type.

19. The program according to Claim 15 wherein said program specific to the content type is operable to further effect the steps of:

capturing content data of said content type, and

deleting intermediate data of said content type in an intermediate data memory.

20. The program according to Claim 15 being operable to further effect the steps of:

assigning display priorities to respective ones of said plurality of information objects;

comparing said display priority of said particular information object with a predetermined threshold to thereby determine whether or not the intermediate data of said particular information object should be generated; and

comparing said display priority of said particular information object with a predetermined threshold to thereby determine whether or not the display image of said particular information object should be generated.

21. The program according to Claim 15 wherein:

said program specific to said content type is operable to further effect the step of deleting said generated intermediate data;

the step of generating intermediate data includes storing said intermediate data in a memory; and

said first program being operable to further effect the steps of:

assigning display priorities to respective ones of said plurality of information objects;

comparing said display priority of said particular information object with a predetermined threshold to thereby determine whether or not said intermediate data of said particular information object should be generated or renewed;

causing said intermediate data of said particular information object to be generated or renewed in the intermediate data generating step, when the display priority of said particular information object is higher than the predetermined threshold;

causing said intermediate data of said particular information object in said memory to be deleted in the data deleting step, when the display priority of said particular information object is lower than a predetermined threshold.

22. The program according to Claim 15 being operable to further effect the step of assigning display priorities to respective ones of said plurality of information objects; the display image generating step including, when the display image of said particular information object is to be displayed, determining a form in which said display image of said particular information object is displayed, in accordance with the display priority of said particular information object.

23. The program according to Claim 15 wherein the intermediate data generating step includes storing data for display including intermediate data for displaying said plurality of information objects in a memory region; and

said program is operable to further effect the steps of:

42

detecting an amount of said memory region occupied by said display data; and

sequentially deleting at least part of intermediate data in said memory region which has not been used for display image generation for the longest time.

24. The program according to Claim 15 being operable to further effect the step of selecting one of said plurality of information objects as a representative object and defining said visual field by defining a geometric relation of said representative object to said visual field;

the selecting step including altering said representative object, without changing the geometric relations of said plurality of information objects to said visual field, as said visual field shifts in said virtual space;

said program being operable to further effect the step of traversing linkages between said plurality of information objects, starting with said representative object, to thereby cause intermediate data of an information object in said plurality of information objects to be generated.

25. In an information processing apparatus, a method for displaying a plurality of linked information objects in a virtual space in accordance with visual field data, a particular information object representing a content of a particular content type, said visual field data defining a visual field in said virtual space, said method comprising the steps of:

processing data specific to said content type, including generating intermediate data specific to said content type and generating a display image specific to said content type from said generated intermediate data;

causing intermediate data for displaying said particular information to be generated in said intermediate data generating step, when it is determined, in accordance with a geometric relation between said visual field and said particular information object, that said intermediate data of

said particular information object should be generated; and

causing a display image of said particular information object to be generated from said generated intermediate data in the display image generating step, when it is determined, in accordance with the geometric relation between said visual field and said particular information object, that said particular information object should be displayed.